REMARKS/ARGUMENTS

Reconsideration of the above-identified application respectfully requested.

Claims 1, 17, and 32 stand rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,450,512 issued to Asakura, in view of U.S. Patent No. 4,337,993, issued to Kompfner, and French Patent 2,538,131 issued to Essemlali, et al.

Looking first to Asakura, that patent discloses an improved optical tap. An optical tap is a device for selecting one signal from a multi-signal input and directing that selected signal to a first output fiber. The optical tap simultaneously directs all other input signals to a second output fiber. The selected signal may change, but the optical tap always directs only one signal to a specified output fiber and all other signals to a different output fiber. Asakura's improvement to existing optical taps was to separate the input signal using a diffraction grating rather than a light polarizer. With this improvement, Asakura's device experiences less loss and noise than prior optical taps; however, its purpose or function does not change. Asakura's device is an optical tap for selecting a particular (only one) signal and passing off all others. This is evidenced by looking at the embodiments shown in Figs. 1, 4-11 and 14. Each and every embodiment discloses an input fiber and two output fibers. One output fiber receives one selected signal having a particular wavelength. Signals of all other wavelengths are passed through the second output fiber.

The present invention proposes a different structure to achieve a different purpose. One of the principal benefits of the present method and system is its ability to direct <u>any</u> input signals to <u>any</u> output stations, such as fibers. Claims 1, 17, and 32. Fig. 3 of the present application, and the accompanying discussion thereof, describe, for example, the distribution among four output stations. Fig. 4 shows four inputs and two outputs. Figs. 5 and 6 illustrate an arrangement of even more output stations. See also Tables I and II of the present application. The moveable diffractive optical element (MDOE) is capable of acting as an optical tap, but, unlike an optical tap, the output signals diffracted from the MDOE may be divided among more than two output fibers. This multidirectional feature is achieved through a holographic diffraction grating including an array of facets, each of the facets carrying a diffraction grating(s) which is superimposed, each being angularly offset with respect to each other. Claims 1, 17, and 32. Asakura does not disclose such a holographic grating with a plurality of superimposed diffraction gratings. Another structural difference between Asakura and the invention is the presence or absence of a reflective surface. With the present invention, no such surface is needed. For Asakura's optical tap, however, such a surface is required. The reflective surface,

generally a mirror, reflects only one certain wavelength of the dispersed light to the first output fiber. Col. 2, line 65-Col. 3, line 3. The dispersed wavelengths not reflected are coupled to the second output fiber. Col. 3, lines 14-17. The reflective surface in the remaining embodiments is mirror 14 in Fig. 1, 54 in Fig. 4, 64 in Fig. 5, 74 in Fig. 6, 84 in Fig. 7, 94 in Fig. 8, 104 in Fig. 9, 114 in Fig. 10, and 124 in Fig. 11. Fig. 14 includes reflecting surfaces 134 of waveguide 133. The structural differences between Asakura and the present invention are directly related to the fact that the devices perform different functions.

To overcome the deficiencies of Asakura, Kompfner and Essemlali are cited and it is argued that it would have been obvious to combine a holographic grating with superimposed diffraction gratings to Asakura's optical tap in order to increase its speed and change the number of input signals that may be multiplexed/demultiplexed by the diffraction gratings. Applicants respectfully submit that this combination of references is improper and does not render the claimed invention obvious.

First, it should be noted that Asakura, the primary reference, presents a different problem from that of the present invention. Asakura looks to improving the performance of optical taps. Direction of multiple signals to multiple outputs is outside the scope of what Asakura is trying to achieve. Modifying Asakura in the manner argued would give the device additional capabilities that are neither taught or suggested by Asakura to be desirable. Also, to modify Asakura to achieve the claimed invention would require eliminating an element that Asakura teaches to be necessary, namely a reflective surface.

Kompfner discloses a fiber coupling system, which couples each of a plurality of inputs to a particular output. Although it utilizes a holographic diffraction grating, Kompfner's optical element is stationary. Col. 1, lines 39-41. Each input fiber is always directed by the grating to only one predetermined output fiber.

Essemlali discloses using diffraction gratings to direct optical signals, but Essemlali's device requires two diffractive elements, neither of which has a plurality of diffraction grating of different spacings superimposed on one another. Essemlali's gratings are arranged linearly on the surface of a plate, 6, and the plate is moved transversely, as indicated by the directional arrow (Fig. 2), to position a given grating at a given angle with respect to the input. A second series of diffraction gratings on plate 8, which are arranged similarly to the first series, ensures that the dispersed wavelengths from the first grating are directed to the proper output fibers.

"Almost all inventions are combinations of old elements, whose selection as a new unit gives them their only importance." Philip A. Hunt Co. v. Mallinckrodt Chemical Works, 177 F.2d 583, 585 U.S.P.Q. 277, 279. It is the rotation of a holographic diffractive optical element with superimposed diffraction gratings that enables the invention to efficiently and simply distribute the input signals among all possible output fibers. It appears that, using the claim as a roadmap, the invention's features were selected in isolation from various references in the prior art. For example, Asakura is cited for the rotation of a diffractive element, even though Asakura teaches against distributing an input among more than two outputs. Kompfner is cited for a holographic diffraction grating and combined with Asakura's movable diffraction grating, even though Kompfner teaches against movement of a grating. Such combination is improper. There must be some teaching, suggestion, or motivation to combine the references. No teaching, suggestion, or motivation exists to combine the cited references.

Assuming, *arguendo*, that the references could properly be combined, they still do not disclose the invention. None of the references recognize the importance of a holographic diffraction grating with stacked or superimposed diffraction gratings, which give the invention phenomenal performance efficiencies. This vertical arrangement clearly is superior to the horizontal or linear arrangement of Essemlali. A typical fiber bundle may include tens of thousands of signals. To handle that many signals, the Essemlali's plate of linear diffraction gratings would be large and unwieldy. The present invention, by contrast, has the weight and size of a single diffraction grating. By holographically superimposing them on top of one another, many diffraction gratings, each with a unique grating spacing, are combined on one disk. This is particularly important given that one of the primary problems faced in distributing signals is quickly and accurately moving or rotating the diffractive element from one position to another. The more diffraction gratings added to Essemlali's device, the more difficult the plate (6 in Fig. 2) will be to linearly move back and forth. In particular, the logistics of starting and stopping motion of the plate will become increasingly difficult as the plate gets larger to accommodate the diffraction gratings. These advantages also are not recognized by Kompfner whose diffraction grating is stationary and only provides direction of a particular input signal to a particular output fiber, i.e., a one-to-one transmission.

In view of the above, the claims of the present invention are allowable over Asakura, Kompfner, Essemlali, and the combination thereof.

Claim 3 stands rejected under 35 U.S.C. § 103 as being unpatentable in view of Asakura, Kompfner, Essemlali, and further in view of U.S. Patent No. 5,608,278 (Mey, et al.) Claim 3 should be considered allowable for the reasons given above in connection with claim 1.

In view of the above, Applicants respectfully request that the claims be allowed.

Respectfully submitted,

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